

3.9 Proving Trigonometric Identities

Name _____ Date _____ Period _____

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Multiply and simplify.

1) $(\sin x + 1)(\sin x - 1)$

1) _____

2) $(2 \cos x + 1)(\cos x - 1)$

2) _____

3) $(\csc x + \sin x)^2$

3) _____

4) $(2 \sin x - 1)(2 \sin x + 1)$

4) _____

Factor and simplify the expression.

5) $2 \sin^2 x - 5 \sin x - 3$

5) _____

6) $\tan^2 x - 6 \tan x + 8$

6) _____

7) $4 \sec^2 x + 4 \sec x + 1$

7) _____

8) $\tan^2 x - \sec^2 x$

8) _____

Prove that each of the following equations is an identity. Show all work! Each step!

9) $\sin(\theta) \cot(\theta) = \cos(\theta)$

9) _____

10) $1 - \sec(x) \cos^3(x) = \sin^2(x)$

10) _____

11) $\frac{\cos(x) \sin^2(x) + \cos^3(x)}{\sin(x)} = \cot(x)$

11) _____

12) $\frac{\sin(x)}{\csc(x)} + \frac{\cos(x)}{\sec(x)} = 1$

12) _____

13) $\tan(\theta) \cos(\theta) + \csc(\theta) \sin^2(\theta) = 2 \sin(\theta)$

13) _____

14) $(1 - \sin^2(x)) (1 + \sin^2(x)) = 2 \cos^2(x) - \cos^4(x)$

14) _____

$$15) \quad \tan(x) + \cot(x) = \sec(x) \csc(x)$$

15) _____

$$16) \quad \frac{\sin x}{\sin x + 1} = \frac{\csc x - 1}{\cot^2 x}$$

16) _____

$$17) \quad \frac{\csc x + 1}{\csc x - 1} = \frac{1 + \sin x}{1 - \sin x}$$

17) _____

Find the amplitude, period, and phase shift for the function.

$$18) \quad y = -4 \sin\left(\frac{2\pi x}{3} - \frac{\pi}{3}\right)$$

18) _____